The Role of Learning Progressions in Competency-Based Pathways

Achieve

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INTRODUCTION

Academic expectations for K–12 students are higher than ever — all students are now expected to exit high school college and career ready. For students to do so successfully, teachers must be highly adept at monitoring the progress of each student and adjusting instruction accordingly. Yet two problems get in the way of success: The traditional system moves students through as cohorts and it has struggled to capitalize on what is known about student learning. The result for students has been described as "swiss cheese" learning gaps, in which students move from grade level to grade level but lack sufficient knowledge to understand and master more challenging concepts.[1] Two notable fields of work are tackling these problems on parallel tracks.

A growing number of states and districts across the country are taking steps to implement **competency-based pathways (CBP)**, which move students along the K–12 continuum only when they exhibit mastery — not as a unified class cohort. The need to deeply understand student learning is particularly important in a competency-based system, both in terms of knowing what it means to achieve mastery and ensuring that each student is engaged in daily instructional activity that will best move him or her to deeper conceptual learning and application of knowledge. These pioneer states and districts have some of the strongest appetites for new approaches to professional learning and resources that will help teachers personalize instruction.

Simultaneously, learning scientists within the core subject areas of mathematics, science, and English language arts (ELA/literacy) have been studying and mapping the ways students learn key concepts. The resulting **learning progressions** have the potential to strengthen teachers' ability to analyze and respond to the individual learning needs of students. But bringing research into practice takes proactive effort. Researchers and practitioners often struggle with differing terminology, priorities, and performance pressures. As a result, few examples of learning progressions research are taking hold within K–12 education, though the examples that exist are promising.

In early 2015, leaders within Achieve's Competency-Based Pathways State Partnership set out to more clearly understand the potential of learning progressions research to transform instructional practice and what is being done to translate that research into training and tools for educators. After a series of conversations with experts in the learning sciences, Achieve convened a set of state leaders, researchers, and practitioners in May 2015 to identify promising efforts and steps to ensure that state and district leaders can use this growing base of research. This report captures key findings from that conversation and identifies areas for further work.

Achieve's Competency-Based Pathways State Partnership

Achieve is committed to helping states innovate to reach college- and career-ready goals for students. Over the past two years, Achieve's Competency-Based Pathways State Partnership has brought together 12 states that are pursuing the necessary policy and implementation changes to shift traditional education to a competency-based system. These state partners are keenly focused on issues related to graduation requirements, assessment, and accountability. The partnership states seek to better understand what must change within the current system to make the vision of personalized learning become a reality for every student.

Please see www.achieve.org for resources and tools developed to support states in the transition to competency-based pathways.

A USEFUL ANALOGY

The field of learning progressions research has not yet settled on common terminology and definitions. Participants in Achieve's convening found that one particular analogy offered a clear, useful way to conceptualize learning progressions. This analogy enabled a productive conversation despite the occasional language barrier and is used here to establish use of a few key terms in this report.

In this analogy, the process of teaching is like helping students move from their current state of knowledge and skill to a learning goal on the other side of a river. Learning progressions are formations of stepping stones across that river. Learning progressions research uses both theory and observation of student learning to identify the array of possible stones that can be used to move toward the learning goal.

Individual students will each travel their own unique paths, but when learning sciences research illuminates the array of stones that are available, teachers gain a better understanding of the various ways students could navigate to the learning goal. Knowledge of learning progressions helps teachers identify commonly travelled paths, which informs whole-group instruction. Knowledge of common paths taken also has informed the recent development of college- and career-ready (CCR) standards.

Although a variety of terminology is in use across the field of learning progressions, for the purposes of this report we define the following terms:

A **"learning goal"** could be a single standard or competency, an intermediate goal on the way to a standard or competency, or a combination of standards or competencies.

"Learning progressions research" identifies stones that students could use to progress, creating a visual or conceptual map of how those stones relate to each other.

"Learning progressions" map out commonly travelled paths that students take. Learning progressions can be used to design or modify instruction.

"Student learning path" describes the unique, personalized path each student travels to achieve the learning goal. In a competency-based system, teachers can apply what is known about common learning progressions to track and move students along their individual paths.

The **"grain size"** of a learning progression can be thought of as the expanse between the starting bank and the learning goal. A learning progression could span the Mississippi River (perhaps several years' worth of learning), or it could span a tiny creek (which could be a week's worth of learning).
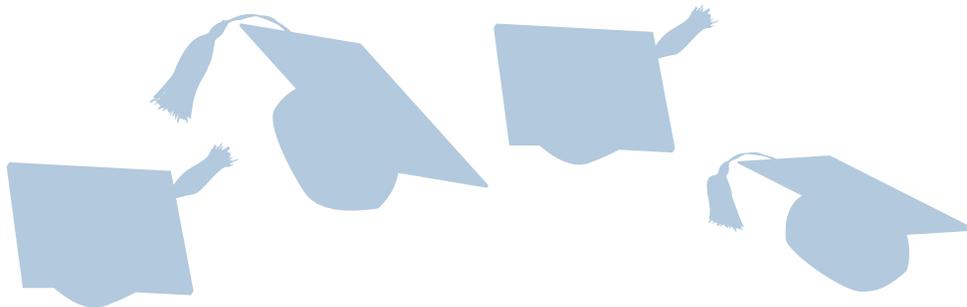
UNDERSTANDING LEARNING PROGRESSIONS

Achieve convened content experts in learning sciences with state and district policy leaders and practitioners to bring to light a range of perspectives related to learning progressions and confirm areas of agreement about what learning progressions are and are not. The conversation helped to establish a baseline understanding of the field of learning progressions by highlighting areas of agreement, exploring the relationship between learning progressions and established structures of content standards and assessments, and featuring examples of the ways learning progressions are being used in classrooms today.

Areas of Agreement

Learning progressions are **visual and conceptual maps** that explain how students might move from simpler to more sophisticated understanding within a subject area. Learning progressions describe conceptual milestones in student learning and are sometimes referred to as the "messy middle" between a student's present understanding and where educators need the student to end up. Progressions **can help teachers better understand *how* students develop and demonstrate knowledge and skills**, opening what might otherwise feel like a black box as they teach and reteach. Learning progressions also help teachers see nuance in student work to recognize whether students are exhibiting novice understanding or if they have truly mastered new content and are able to apply it to unique situations.

Learning progressions should be **empirically-based** — validated by researchers who study student responses to instruction. Learning progressions can and should be constantly refined as education researchers and practitioners observe the pathways students take to acquire new knowledge and skills.

Researchers and practitioners agree that **there is not one single "immaculate progression"** — students progress in their learning in various ways as they develop more sophisticated and complex understanding of the world.[2] A student's movement through learning progressions is not expected to be linear or to follow a predetermined route. As teachers use learning progressions research to better understand student needs, they also need to take into account differences among students in knowledge and understanding currently held, motivation for acquiring new knowledge and skills, and strengths and challenges brought to bear in learning tasks.

Student learning within each content area is comprised of a balance of content knowledge and skills. For example, the development of literacy is a balance of learning new and more sophisticated concepts, such as "evidence" and "argumentation," and the ability to apply these concepts in increasingly more complex textual contexts. For mathematics, an understanding of place value and decimals will progress to working with decimal numbers, integer exponents, and scientific notation.

Relationship to Content Standards and Assessments

The education system is currently galvanized in the implementation of CCR standards. As state leaders and educators are focused on aligning current practice with new standards and assessments, explaining how learning progressions relate to, and could possibly support, those efforts is important.

Content standards establish grade-level goals that serve as guideposts along an expected path that ends in academic readiness for postsecondary education and training. CCR content standards outline the knowledge and skills that students should demonstrate at the end of high school, giving teachers within each grade level responsibility for moving students toward that ultimate goal. Content standards might be informed by learning progressions research. The study of learning progressions can help teachers understand the intermediate learning that must take place for students during the school year and decipher the best routes for individual students to take in pursuit of annual academic goals.

Sample of Definitions Used by Learning Progressions Experts

Some definitions of learning progressions emphasize sequence and recognition of progress:

- "A description of skills, understanding and knowledge in the sequence in which they typically develop: a picture of what it means to 'improve' in an area of learning" (Masters & Forster, 1997).[3]

- "Descriptions of successively more sophisticated ways of thinking about an idea that follow one another as students learn: they lay out in words and examples what it means to move toward more expert understanding" (Wilson & Bertenthal, 2005).[4]

- "Carefully sequenced set of building blocks that students must master en route to a more distant curricular aim. The building blocks consist of sub skills and bodies of enabling knowledge" (Popham, 2007) .[5]

- "Descriptions of children's thinking and learning in a specific mathematical domain, and a related conjectured route through a set of instructional tasks designed to move children through a developmental progression of thinking, created with the intent of supporting children's achievement of specific goals in that mathematical domain" (Clements & Sarama, 2004).[6]

Others use a description of knowledge changing over time:

- "Reasonably coherent networks of ideas and practices … that contribute to building a more mature understanding" (Duschl, Schweingruber, & Shouse, 2007).[7]

- "Descriptions of the successively more sophisticated ways of thinking about a topic that can follow one another as children learn about and investigate a topic over a broad span of time" (Duschl, Schweingruber, & Shouse, 2007).[7]

- "Based on research syntheses and conceptual analyses and describe successively more sophisticated ways of reasoning in a content domain that follow one another as students learn" (Smith et al., 2006).[8]

Some note a predictive quality:

- "Represent not only how knowledge and understanding develops, but also predict how knowledge builds over time" (Stevens et al., 2007).[9]

- "Identify key waypoints along the path in which students' knowledge and skills are likely to grow and develop in school subjects" (Corcoran, Mosher, & Rogat, 2009).[10]

Descriptions might specify that learning progressions are evidence-based:

- "A description of an empirically tested pathway" (Mosher, 2011).[11]

In 2008, Karin Hess reviewed existing definitions to outline four guiding principles, explaining that learning progressions:[12]

- Are developed (and refined) using available research and evidence;

- Have clear binding threads that articulate the essential core concepts and processes of a discipline (sometimes called the "big ideas" of a discipline);

- Articulate movement toward increased understanding (meaning deeper, broader, more sophisticated understanding); and

- Go hand in hand with well-designed and aligned assessments.

Educators across states have engaged in the **practice of "unpacking standards"** to articulate what they expect to see throughout the year on their way to achieving content standards. The resulting guides are not necessarily empirically-based learning progressions, though the process of analyzing what should take place to help students achieve grade-level standards presents an opportunity for practitioners to draw from, and possibly add to, learning progressions research.

Learning progressions can also inform the development and use of **assessments** — both formative and summative. Research by Karin Hess found that after teachers used learning progressions to set expectations for and analyze student work, they gained a clearer understanding of what "within grade-level progress" could look like and built confidence using assessment techniques and tools to monitor student progress.[13] Learning progressions have the potential to help teachers understand how to use assessment data to analyze student learning and determine strategic next steps for instruction.

How Learning Progressions Are Being Used Today

There are a variety of ways that learning progressions are being used by districts in their states to help teachers align instruction with new standards and equip them to make the shift to competency-based systems. The examples shared during the convening suggest that learning progressions have the potential to help teachers improve their practice and empower students to plot and monitor their own academic progress. This potential arises in three areas of activity:

1. **Connecting research and practice.** The study of learning progressions is an opportunity to tighten the relationship between research and practice. Convening participants noted that many practitioners are not currently versed in what is known about how children learn, though they are expected to ensure that all students achieve lofty learning goals. Appetite to dive into the detail of learning progressions research will vary, but all teachers benefit from a clear understanding of the research base.

   Marge Petit explained that when the Ongoing Assessment Project (OGAP) first began delivering professional development for teachers, the team quickly realized that teachers wanted more time to understand the research that underpins learning progressions. In response, OGAP trainings increased from three hours initially to four to five days per content area. By contrast, state team members from Oregon noted that many of their teachers have felt overwhelmed by the volume of materials that accompanied the new state standards and assessments and were best able to absorb the learning progression content if progressions could be presented in 45-minute professional development chunks.

Ongoing Assessment Project (OGAP)

OGAP uses a combination of learning progressions at a grain size usable in the classroom and formative assessment to equip teachers to interpret student evidence and convert their analysis into appropriate instructional plans for each student. The project is based on the belief that teachers are better instructional leaders when they fully understand how students develop mathematics skills and concepts, have resources to monitor student progress, and have received professional development that helps them dissect the teaching and learning process. Research indicates that formative assessment is an essential mechanism to help students succeed. OGAP uses formative mathematics assessments to help teachers analyze the best next steps to help students grasp more sophisticated mathematics concepts. OGAP's design is based on four principles:

(1) Build on students' pre-existing knowledge;

(2) Teach (and assess) for understanding;

(3) Use formative assessment intentionally and systematically; and

(4) Build assessments based on mathematics education research.

A study of 936 students in grades 2–5 found that, on average, student scores on pre- and post-assessments at the beginning and end of an instructional unit in which OGAP was used increased 38 percentage points; a six-month follow-up study showed that the students retained those gains. Further, students in the follow-up study who were new to their schools (i.e., did not benefit from OGAP) had significantly lower mean scores.

In these studies, teachers reported that knowledge of the mathematics education research and its use as a part of an intentional and systematic approach to formative assessment helped them: (1) better understand evidence in student work to make informed instructional decisions; (2) better understand activities in mathematics programs; and (3) influence instruction.

Vermont Mathematics Partnership's Ongoing Assessment Project. (2005). Unpublished Student Work Samples and Data. Montpelier, VT. Cited on the OGAP website. www.ogapmath.com

2. **Personalizing the learning experience.** A teacher's understanding of learning within a content area equips him or her to analyze effective strategies to help students meet content standards. Learning progressions help teachers use formative assessment practices, make strategic decisions about the ways they group students, and assign tasks and support to individual students. In recent years, efforts have been undertaken to help teachers apply learning progression-based professional development to their classroom practice. Donna Donnell, math coordinator, Sanborn Regional School District, noted that teachers in New Hampshire have become more comfortable with content through training on learning progressions but are able to convert their knowledge base to student outcomes only if they can decipher student work daily to see evidence of the best next steps.

Awareness of learning progressions can also help students develop a stronger sense of strategy and purpose as they learn. Despite high postsecondary aspirations, many students struggle to academically advance in relation to their goals. When students are able to see that they can take smaller steps to achieve mastery of big ideas, they become empowered to better prepare themselves for postsecondary education and work.

3. **Focusing on "big ideas."** Standards are not meant to be taught in isolation from one another. For teachers to move students toward the goals of several content standards at once, they need to understand how the standards are designed to ensure that students ultimately master core concepts within and across subject areas. For example, the CCSS and Next Generation Science Standards (NGSS) include supplementary material that is designed to highlight big ideas across grades, topics, and standards. Such descriptions of how the content standards serve as landmarks along the way to core concepts prepare teachers to use those big ideas to connect each part of the learning experience. Teachers armed with an understanding of learning progressions that lead to the core concepts are then equipped to connect day-to-day instructional planning with annual learning goals and longer-term goals that extend beyond the current grade level or course. Learning progressions can empower teachers to be creative in their instructional design and can free teachers up from relying on textbooks or allow them to skip an element of instruction that does not apply directly to a content standard.

THE CURRENT STATE OF LEARNING PROGRESSIONS RESEARCH

Drawing from the "stones across a river" analogy, learning progressions research aims to illuminate the stepping stones that exist between a student's beginning learning state and desired learning goal. Though individual students take their own unique paths, generalized knowledge of the ways students learn within a discipline can help teachers pinpoint each student's current position and determine the best next steps to move students toward the big ideas they need to master. Learning scientists study

the paths students tend to take to help teachers answer the questions: "Where is this student now, based on the knowledge and skills he exhibits? How can I help him make progress toward his learning goal?"

There are many strategies for constructing learning progressions, but as Margaret Heritage has explained, any strategy originates as either "top-down" or "bottom-up." In a top-down approach, experts in the domain construct a progression based on their perceptions of big ideas that students need to master and how those ideas connect. This approach allows leading minds in a field to communicate what they believe is most important for students to know. In a bottom-up approach, curriculum content experts and teachers construct a progression based on their experience of teaching children. This approach gives educators an opportunity to outline what they believe is best taught when.[14] Whichever approach is taken, the key difference between a theory of learning and a learning progression is that a learning progression is empirically-based — verified through observation of students in instructional settings.

It is important to reiterate that learning progressions are meant to be illustrative examples for educators, curriculum and assessment designers, and those who establish content standards. There is no single learning progression to which all learners adhere — there is no "immaculate progression." This lack of consistency makes the work of constructing and understanding learning progressions quite complex. But great value can be generated when practitioners make an effort to integrate learning sciences research into instructional practice. For example, when the non-profit New Classrooms set out to design its skills map, its team began with a typically linear scope and sequence (Figure 1) in which all students were expected to travel the same path in their learning. New Classrooms then studied how students were responding to instructional tasks. The team captured the array of paths that students took in their learning to chart possible learning connections between mathematics skills, creating a skills map (Figure 2) that includes thousands of interconnected nodes and potential pathways for students to travel. The skills map is continually improved based on student activity. New Classrooms now has an instructional and formative assessment tool/program that is better able to help teachers pinpoint a student's current location and best next steps as he or she travels toward his or her learning goals.

Several notable efforts are being taken to study and capture learning progressions in the core content areas of mathematics, ELA/literacy, and science. Of these, mathematics is perhaps furthest along, though it is quite difficult to compare efforts. Despite some inherent differences across subject areas, learning scientists within each have produced information, tools, and resources that state and district leaders can use to help educators better decipher and understand student learning needs. Yet gaps remain that make it challenging for competency-based systems to determine whether and how to fully integrate learning progressions research into their new systems.

Figure 1: School of One: Summer Pilot
Linear Learning Progression
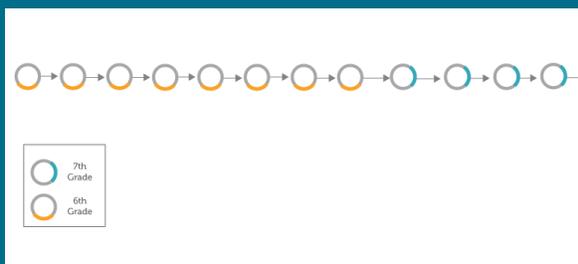
Figure: 2 New Classrooms:
From Linear Progression to "Skills Map"

New Classrooms (2014). http://blog.newclassrooms.org/geeking-out-on-the-skill-map-part-2
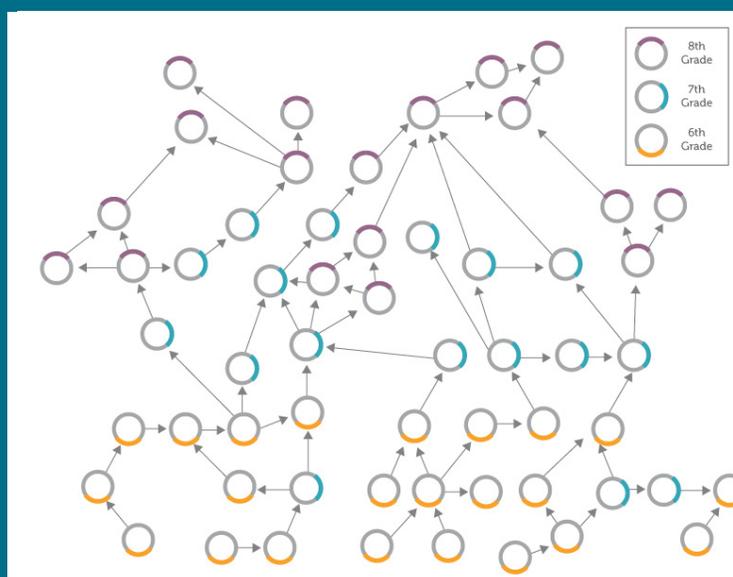
EXAMPLES OF TOOLS AND RESOURCES DESIGNED TO SUPPORT USE OF LEARNING PROGRESSIONS

	Intended Uses	Scope	Description
MATHEMATICS			
Teach to One: Math, by New Classrooms	• provide formative assessment • determine how to personalize learning • select instructional strategies	Grades 5-8	A personalized instructional model for middle school math, including a Teacher Portal that helps teachers analyze student learning and access instructional content. The portal constructs unique student schedules based on a proprietary algorithm. A 2013 study found that results varied across Teach to One schools but on average students made greater-than-average growth.[15]
Ongoing Assessment Project (OGAP)	• provide formative assessment • improve teachers' content understanding • select instructional strategies	Grades 2-5	A formative assessment system in mathematics that includes a field-tested item bank; learning progression frameworks; and a set of instructional strategies designed to build teacher knowledge of content, curricular strategies, and pedagogy. A study of 936 students in grades 2–5 found that, on average, student scores increased 38 percentage points when OGAP was used.[16]
Progressions Documents for the Common Core State Standards for Mathematics (CCSS-M)	• improve teachers' understanding of the connection between learning progressions and standards • develop curriculum and textbooks • inform future standards development • inform learning progression research	Grades K-12	A set of documents that draw from learning progression research to explain why the CCSS are sequenced the way they are, point out cognitive difficulties and pedagogical solutions, and give more detail on particularly knotty areas of learning within mathematics.[17]
TurnonccMath	• improve teachers' understanding of the connection between learning progressions and standards	Grades K-8	An open-source map that describes the underlying scientific research for 18 learning progressions associated with the CCSS-M. Provides detailed descriptions that articulate student progression from prior knowledge and naïve conceptions to more sophisticated mathematical concepts and reasoning.[18]
Learning Map by Scaling Up Digital Design Studies (SUDDS)	• improve teachers' understanding of the connection between learning progressions and standards • enable and support efforts to personalize learning	Grades 6–8	An open-source map of nine "big ideas," broken into sets of learning clusters that each have an underlying learning progression to describe behaviors associated with increased sophistication in understanding. Opening a tab in the map reveals alignment with the CCSS-M. Currently under development: a diagnostic assessment for each cluster, curricular links mapped to clusters, and a scope and sequence tool.[19]
Learning Progressions Frameworks Designed for Use with the CCSS-M	• improve teachers' understanding of the connection between learning progressions and standards • inform development of curriculum and assessment	K–12	A conceptual framework organized into six learning progression strands that are aligned to the CCSS-M. The framework is designed to help teachers focus instructional emphasis, interpret student learning paths, and plan lessons effectively. Direct links are made to much of the CCSS-M, but additional descriptions of learning that do not correlate with any item in the CCSS are included.[20]

Note: This is not an exhaustive list. It is meant to provide examples of resources that have been developed for practitioners. It is also not meant to be an endorsement of any specific resources.

	Intended Uses	Scope	Description
SCIENCE			
NGSS Appendix E: Progressions Within the Next Generation Science Standards (NGSS)	• improve teachers' understanding of the connection between learning progressions and standards	Grade bands K–2, 3–5, 6–8, and 9–12	A document built on the National Research Council's 2012 *Framework for K–12 Science Education* that outlines disciplinary core ideas and cross-cutting concepts that students should develop by engaging in science and engineering practice. This structure is a shift from past science standards, which tended to focus on isolated facts within disciplines. Appendix E expresses the standards as a progression of core ideas within each discipline.[21]
ENGLISH LANGUAGE ARTS (ELA)/LITERACY			
Learning Progressions Frameworks Designed for Use with the CCSS for ELA/Literacy	• improve teachers' understanding of the connection between learning progressions and standards • inform development of curriculum and assessment	K-12	A conceptual framework organized into seven learning progression strands that are aligned to the CCSS for ELA/literacy. The framework is designed to help teachers focus instructional emphasis, interpret student learning paths, and plan lessons effectively. Direct links are made to most of the CCSS for ELA/literacy, but additional descriptions of learning that do not correlate with any item in the CCSS are included.[22]

UNANSWERED QUESTIONS AND GAPS TO OVERCOME

Learning progressions research and CBP are pushing for the same objective — both efforts seek to help educators better understand and respond to individual learning needs. Yet despite the fact that these important bodies of work are simultaneously finding ways into the current educational system, they are doing so separately.

It seems logical that learning progressions would play a particularly important role in competency-based systems, which are more focused on individual learning experiences than traditional models of seat time and grade levels. Learning progressions research has the potential to hone the focus of curriculum development, formative assessment, and summative assessment. It has the potential to give teachers a better understanding of the content they convey to students, equipping them to analyze student responses to instruction and to personalize lesson plans on a day-to-day basis. And teachers have the potential to help researchers pilot and refine learning progressions once the necessary systems and structures are in place.

At this time, there are real opportunities to better understand how the use of learning progressions research affects student outcomes and to learn how to leverage learning progressions research itself to understand how CBP affects student learning. Work is needed in four areas to address these questions and fill current gaps in knowledge:

- **Establish shared language and definitions.** Researchers and practitioners struggle to communicate with each other about the development and use of learning progressions. This struggle is primarily due to unclear terminology, which can be exacerbated by the fact that some terms are context specific within states and districts. Some terms are used interchangeably when it is not clear that they are actually the same thing, such as learning progressions, trajectories, and maps. Some phrases, such as "grain size," are repeated frequently in conversations but are likely being interpreted by participants in a variety of ways. In some cases, practitioners use terms that are specific to their own implementation efforts but are unfamiliar to

researchers, such as "competency-based." The confusion over terminology prevents conversations from tackling more important matters and can engender frustration when participants sense that there is not even agreement on whether there is disagreement.

In addition to wrestling a common understanding of terms being used, the field would also benefit from a clear definition of the core elements of a learning progression. How could a person distinguish a learning progression from something that is not? The characteristics of learning progressions vary across subject areas, but which concepts are held in common? For example, conversations during Achieve's meeting on the issue illuminated great variation in participants' understanding of the differences between "standards progressions" and "learning progressions."

- **Fill research gaps.** First and foremost, research is needed to determine whether the use of learning progressions makes a difference for student learning. This research also needs to include an analysis of the structures and practices that increase the likelihood that learning progressions will promote better student outcomes.

Terms with Murky Meanings

The same or different?
- Learning **progression**
- Learning **trajectory**
- Learning **map**

An unclear relationship:
"standards" and **"competencies"**

Possible meanings of **"grain size"**
- Concepts of time, such as a grade level
- Concepts of detail when breaking learning into many parts

If evaluation efforts deem learning progressions to be effective mechanisms for change, addressing the fact that learning progressions are not available for the entire K–12 continuum will be important. For example, research on learning progressions in high school is currently underdeveloped. Learning scientists will need to devote research attention to these gaps to ensure that students are able to benefit from the potential of learning progressions at all points within K–12. This is an opportunity for the research and education communities to work together to expand the knowledge base. As teachers strive to personalize learning in the classroom, analyzing individual students' responses to instruction, they have the opportunity to help learning scientists develop and refine learning progressions. Researchers will benefit when mechanisms are established to engage teachers in learning progressions research, enabling them to play a role and provide feedback to continuously improve and advance the field.

> **"This work shows how you can help kids move in different ways. We need to engage teachers deeply with researchers in practice."**
> — Linda Pittenger, National Center for Innovation in Education

- **Acknowledge and validate a variety of approaches.** Learning progressions have been developed along different paths and with different expectations for the purposes they will serve and how they will be used to inform instruction, assessment, competency-based progressions, and other uses. Rather than seeking to arrive at a more narrow, specific set of definitions and terminology, one option may be to acknowledge the variety of learning progressions and how they vary according to their specific purposes and to validate their use for these purposes with evidence from research.

- **Develop guidance for using learning progressions.** Educators have expressed uncertainty about how and when to use learning progressions to guide their instructional practice. In the face of an evolving research base, they seek a professional standard or agreement that indicates that a progression is good enough to be used in classrooms today, even as efforts are under way to build upon and improve what currently exists. Educators also need the learning scientists to indicate when adhering to a particular sequence in a progression is essential and when a sequence is flexible as long as the progression makes sense for the individual student.

When developing guidance and training to help educators understand and use learning progressions, it is also important to consider the unique needs of various teacher groups. First and foremost, the presentation of learning progressions to teachers should be connected to current structures and materials, not given as an additional resource for teachers to make sense of on their own. The actual instructional materials created to express and support learning progressions need to be clear enough in purpose, scope, and design for teachers to implement with ease. Further customization also might be needed for subgroups of teachers within a school, district, or state. For example, learning progressions research is more fully developed for grades K–8, but compared to their middle school and high school counterparts, elementary school teachers have demonstrated greater difficulty translating that mass of information into professional learning. This difficulty is likely due to the fact that most elementary teachers do not specialize or have deep training in every subject they teach.

"There is currently a huge gap between what researchers understand about how children learn and what practitioners are doing. This is the way to get at personalization."
— Gerrita Postlewait, Learning Matters

- **Make connections between learning progression silos.** Educators have identified a few ways in which the current organization of learning progressions limits their use for classroom instruction. Learning progressions are typically organized by key concepts within a subject area, but teachers should be able to see the relationships not only within progressions but also among progressions. When instruction is designed to be interdisciplinary, teachers will also need to be able to see connections among learning progressions across subject areas. Understanding these connections helps teachers plan strategically to maximize the learning value of each instructional activity. Karin Hess suggests using competencies to make links between progressions instead of waiting for research to suggest an approach.

  Practitioners and policy leaders also want to see more interdisciplinary instructional approaches, but learning progressions research is not organized that way. This interdisciplinary approach would be a significant challenge for learning scientists to tackle since learning progressions across domains vary in structure.

IDEAS TO MOVE THE FIELD FORWARD

As teachers in both traditional and competency-based systems seek guidance that will help them implement new standards and advance all students toward the goal of college and career readiness, state leaders and researchers could consider a few strategies to tackle unanswered questions and knowledge gaps:

- **Establish a cohort of districts to demonstrate and study learning progression implementation.** A joint effort between researchers and practitioners could (1) study whether learning progressions research improves teachers' ability to analyze and personalize the path and pace of student learning; and (2) allow for better understanding of what it takes to make effective use of learning progressions in the classroom. A cohort of districts could simultaneously implement a single learning progression within each core subject: mathematics, science, and ELA/literacy. The effort could be designed to study the training that is needed to build content knowledge and teacher capacity to use learning progressions to inform daily instructional practice. It could be paired with efforts to develop assessment and technology-based tools that ease teachers' burden.

  One idea suggested by meeting participants was to have participating districts apply the framework of Anthony Bryk's improvement science, which aims to accelerate improvement within a field using short cycles to test, improve, and refine new ideas. Improvement science would encourage participating researchers and districts to identify the problems they aim to tackle with learning progressions, capture variation in use, observe how local conditions shape the experience, and measure outcomes from the effort. The cohort could run a few rapid cycles of "Plan, Do, Study, Act," as Bryk suggests,

creating momentum as each round reveals information that can be used to seek improvement in the next round.[23] CBP states are well positioned to prompt and participate in such an effort, which could ultimately establish guidance for states and districts.

- **Tackle current knowledge gaps within learning progressions research.** Convening participants referenced a few areas in which learning progressions research is needed, such as developing progressions for high school and making connections between learning progressions within and across subject areas. An effort could be established to bring researchers and educators together to develop empirically-supported learning progressions that aim to fill those gaps in the research base, giving teachers and students the opportunity to benefit from a stronger understanding of student learning.

- **Develop tools that help teachers make use of learning progressions.** Teachers will need professional learning opportunities to develop an understanding of learning progressions, but that is not enough to help teachers fully use learning progressions research within their classrooms. Resources have emerged that help teachers understand the connection between content standards and learning progressions, but teachers also need tools that help identify individual student needs on a daily basis and make strategic instructional decisions that personalize the learning experience for each student.

These activities could help strengthen connections between the field of learning progressions research and practicing educators in traditional and competency-based systems. State CBP leaders are well positioned to participate and capitalize on such efforts, which create opportunities to engage educators and advance conversations about the shift to personalized, competency-based instruction within their states.

ENDNOTES

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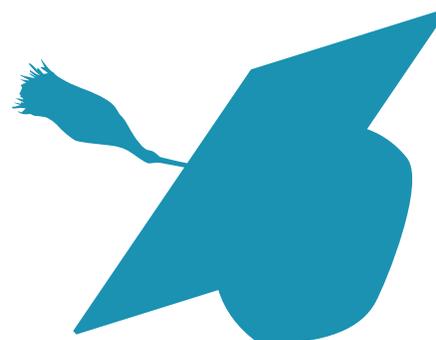
ABOUT ACHIEVE

Achieve is an independent, nonpartisan, nonprofit education reform organization dedicated to working with states to raise academic standards and graduation requirements, improve assessments, and strengthen accountability. Created in 1996 by a bipartisan group of governors and business leaders, Achieve is leading the effort to make college and career readiness a priority across the country so that students graduating from high school are academically prepared for postsecondary success. When states want to collaborate on education policy or practice, they come to Achieve. At the direction of 48 states, and partnering with the National Governors Association and the Council of Chief State School Officers, Achieve helped develop the Common Core State Standards. Twenty-six states and the National Research Council asked Achieve to manage the process to write the Next Generation Science Standards. Achieve has also served as the project manager for states in the Partnership for Assessment of Readiness for College and Careers, which are developing next generation assessments. And since 2005, Achieve has worked with state teams, governors, state education officials, postsecondary leaders and business executives to improve postsecondary preparation by aligning key policies with the demands of the real world so that all students graduate from high school with the knowledge and skills they need to fully reach their promise in college, careers and life. For more information about the work of Achieve, visit www.achieve.org.